REMARKS

The Examiner rejected claims 1, 4, 5, 7-11, 13, 14, and 16-19 pursuant to 35 U.S.C. § 102(b) as anticipated by Brisken (U.S. Patent No. 4,530,363). Claims 2 and 11 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Brisken in view of Nudell, et al. (U.S. Patent No. 5,085,220). Claim 12 was rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Brisken in view of Buck, et al. (U.S. Patent No. 6,544,181). Claim 16 was rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Brisken in view of Fu, et al. (U.S. Patent No. 4,431,936). Claims 18-20 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Brisken in view of Robinson, et al. (U.S. Patent No. 6,419,633). Claim 3 was allowed.

Applicants respectfully request reconsideration of the rejections of claims 1-2, 4-5, 8-14, and 15-20, including independent claims 1, 8, 9, and 18.

Independent claim 1 was amended to include the limitations of claim 7. Claim 1 recites providing different transmit waveform polarity and apodization to different groups of elements for measuring volume flow simultaneously.

For this limitation, the Examiner cites to col. 4, lines 23-29 of Brisken. Brisken show providing focus by relative delays between annular elements at col. 4, lines 23-29. Firing the annular elements in sequence from the outer element (12) to the inner element (1) accounts for the different distances from each annular element (12-1) to a center point (col. 4, lines 23-29; and Figure 8). Brisken use sequential firing – delaying the start of transmission from each element. Brisken do not disclose different waveform polarity, and do not suggest providing different transmit waveform polarity and apodization to different groups of elements simultaneously.

Independent claim 8 recites three rows having a first length, but a kerf extending in azimuth less than the first length such that at least one kerf-defined element has a greater elevation extent than another kerf-defined element of the array. The Examiner cites to rows [18-26], [27-35], and [36-44] of Figure 5 as the three rows. The kerf along row [18-26] shared with [11-17] is noted as not being as long in azimuth as the three rows (e.g., [18-26]).

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Brisken uses square elements arranged in an approximation to a circle in circumference (see Figure 5). Accordingly, the outer rows (e.g., [1-3], and [11-17]) are progressively shorter by having fewer elements. All of the elements are defined by the surrounding kerfs separating the transducer material in the same size squares. During 2D imaging, Brisken apply common timing to groups of elements having different elevation extent (col. 3, lines 40-50; and Figures 6A and 6B). However, these different groups are formed from the same size base (kerf-defined) elements. Electrical grouping of kerf-defined elements provides for a different size transmitter or receiver, but is still made of a plurality of kerf-defined elements each with a same size. Brisken does not disclose at least one kerf-defined element having a greater elevation extent than another kerf-defined element of the array.

Independent claim 9 recites at least four rows in a fully sampled NxM grid of elements providing a rectangular outer circumference of the array. As discussed above, Brisken approximate a circle in the outer circumference rather than an NxM grid.

Independent claim 18 recites a kerf extending less than an azimuth length of the array such that at least one kerf-defined element has a greater elevation extent than another kerf-defined element of the array. Claim 18 is allowable over Brisken for the same reasons as claim 8.

Regarding the rejection including Robinson, et al., Robinson, et al. provide the same sized kerf-defined elements as well.

The dependent claims depend from corresponding independent claims, so are allowable for the same reasons.

Other dependent claims include limitations the same or similar to other independent claims, so are allowable for the same reasons.

For example, claim 12 is allowable for the same reasons as claim 3. Claim 12 has been amended to tie the imaging and flow measuring to the same array.

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As another example, claim 16 is allowable for the same reasons as claim 1. The Examiner relies on Fu, et al. for claim 16, rather than Brisken for claim 7 (incorporated into claim 1). Fu, et al. disclose a field direction parameter. The field direction defines relative delays to be used for different elements to focus the transmitted waves in a direction. Both Brisken and the cited portion of Fu, et al. do not disclose different or opposite polarity of the transmitted waveforms.

Further limitations patentably distinguish from the cited references. For example, claims 19 and 20 recite relative kerf-defined element sizes. The Examiner notes the sparse array of Robinson and associated switching configuration, and then concludes that the possibility of structural configuration and thus the configuration would have been known to a person of ordinary skill in the art. However, a possibility does not suggest actual configuration.
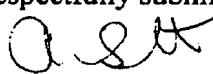
Electrical switching of a sparse array does not result in elements with the recited sizes. The switched elements are still the same size. The kerfs define the elements, and switching several kerf-defined elements of a same size together merely creates a larger transmitter or receiver, but does not change the kerf structuring of the elements.

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CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 943-7554 or Craig Summerfield at (312) 321-4726.

PLEASE MAIL CORRESPONDENCE TO: Respectfully submitted,

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